

WHAT IS CLAIMED IS:

1. A nuclear magnetic resonance flow cell assembly for holding a nuclear magnetic resonance sample, comprising:
a flow cell for holding the nuclear magnetic resonance sample;
5 sample flow tubing for providing fluidic access to the flow cell;
a connector for fluidically connecting the sample flow tubing to the flow cell;
a flow cell adhesive securing a lateral surface of the flow cell to a surface of the connector; and
an internal flow cell adhesive-separation barrier extending between the surface of the
10 flow cell and the surface of the connector, positioned to separate the flow cell adhesive from an interior of the flow cell.
2. The flow cell assembly of claim 1, wherein the internal flow cell adhesive-separation barrier comprises an O-ring.
- 15 3. The flow cell assembly of claim 1, wherein the internal flow cell adhesive-separation barrier comprises a plurality of annular ridges.
4. The flow cell assembly of claim 4, wherein the plurality of annular ridges are integrally
20 formed with the connector.
5. The flow cell assembly of claim 4, wherein the plurality of annular ridges are integrally formed with the flow cell.
- 25 6. The flow cell assembly of claim 1, further comprising an external flow cell adhesive-separation barrier extending between the surface of the flow cell and the surface of the connector, positioned to separate the flow cell adhesive from an external environment of the flow cell, and to center the flow cell with respect to the connector.
- 30 7. The flow cell assembly of claim 1, wherein the connector includes:
a lateral wall enclosing a flow cell connector bore sized to accommodate an end region of the flow cell, wherein the flow cell adhesive is situated along the flow cell connector bore; and

an annular stop for constraining the flow cell longitudinally when the flow cell is positioned in the flow cell connector bore.

8. The flow cell assembly of claim 1, wherein the flow cell assembly further includes:

a sample flow tubing adhesive securing a lateral outer surface of the sample flow tubing to an inner surface of the connector; and

an internal sample flow tubing adhesive-separation barrier extending between the outer surface of the sample flow tubing and the inner surface of the connector, positioned to separate the sample flow tubing adhesive from an interior of the sample flow tubing.

9. The flow cell assembly of claim 1, wherein the connector comprises a radial adhesive-insertion channel extending from an outer surface of the connector to an inner surface of the connector along the flow cell connector bore.

10. The flow cell assembly of claim 1, wherein the connector comprises an adhesive-holding reservoir extending along an adhesive interface between the flow cell and the connector.

11. The flow cell assembly of claim 10, wherein the adhesive-holding reservoir is annular.

12. The flow cell assembly of claim 10, wherein the adhesive-holding reservoir is helical.

13. The flow cell assembly of claim 1, wherein the connector comprises a plurality of longitudinal channels defined along the connector, for allowing a passage of a temperature-control gas along the connector.

14. A nuclear magnetic resonance flow cell assembly for holding a nuclear magnetic resonance sample, comprising:
a flow cell for holding the nuclear magnetic resonance sample;
inlet and outlet sample flow tubing for providing fluidic access to the flow cell; and
a pair of connectors including a first connector for connecting the inlet sample flow tubing to the flow cell, and a second connector for connecting the outlet sample flow tubing to the flow cell, each of the pair of connectors being secured to the

flow cell by an adhesive region, wherein the adhesive region is separated from an interior of the flow cell by an annular adhesive-separation barrier extending between the flow cell and said each of the pair of connectors.

- 5 15. The flow cell assembly of claim 14, wherein the adhesive-separation barrier comprises an O-ring.
16. The flow cell assembly of claim 14, wherein the adhesive-separation barrier comprises a plurality of annular ridges.
- 10 17. A nuclear magnetic resonance probe comprising:
a nuclear magnetic resonance flow cell assembly for holding a nuclear magnetic resonance sample, comprising:
a flow cell for holding the nuclear magnetic resonance sample;
15 inlet and outlet sample flow tubing for providing fluidic access to the flow cell;
a pair of connectors including a first connector for connecting the inlet sample flow tubing to the flow cell, and a second connector for connecting the outlet sample flow tubing to the flow cell, each of the pair of connectors being secured to the flow cell by an adhesive region, wherein the adhesive
20 region is separated from an interior of the flow cell by an annular adhesive-separation barrier extending between the flow cell and said each of the pair of connectors; and
a set of nuclear magnetic resonance coils coupled to the flow cell assembly, for performing a nuclear magnetic resonance measurement on the sample.
- 25 18. A nuclear magnetic resonance method comprising:
inserting a nuclear magnetic resonance sample into a nuclear magnetic resonance flow cell assembly comprising
a flow cell for holding the nuclear magnetic resonance sample;
30 inlet and outlet sample flow tubing for providing fluidic access to the flow cell;
a pair of connectors including a first connector for connecting the inlet sample flow tubing to the flow cell, and a second connector for connecting the outlet sample flow tubing to the flow cell, each of the pair of connectors

being secured to the flow cell by an adhesive region, wherein the adhesive region is separated from an interior of the flow cell by an annular adhesive-separation barrier extending between the flow cell and said each of the pair of connectors; and

5 performing a nuclear magnetic resonance measurement on the sample while the sample is situated in the flow cell.

19. The method of claim 18, further comprising inserting the flow cell assembly into a nuclear magnetic resonance probe through a central bore of the nuclear magnetic
10 resonance probe while the nuclear magnetic resonance probe is positioned in a nuclear magnetic resonance magnet.

20. The method of claim 19, further comprising removing the flow cell assembly from the nuclear magnetic resonance probe through the central bore while the nuclear magnetic
15 resonance probe is positioned in the nuclear magnetic resonance magnet.

21. A nuclear magnetic resonance flow cell assembly for holding a nuclear magnetic resonance sample, comprising:
a flow cell for holding the nuclear magnetic resonance sample, the flow cell having a first
20 helical thread along a lateral surface of the flow cell;
sample flow tubing for providing fluidic access to the flow cell;
a connector for fluidically connecting the sample flow tubing to the flow cell, the connector including a flow cell connector bore sized to accommodate an end region of the flow cell, the connector having a second helical thread matching the
25 first helical thread, for securing the connector to the flow cell; and
a sealing barrier positioned between a transverse end surface of the flow cell and a transverse surface of the connector, the sealing barrier being pressed between the flow cell and the connector when the flow cell and the connector are secured together, for sealing an interface between the flow cell and the connector.

22. The flow cell assembly of claim 21, wherein the sealing barrier comprises an O-ring.

23. The flow cell assembly of claim 21, wherein the sealing barrier comprises a ferrule.

24. The flow cell assembly of claim 21, wherein the connector laterally encloses the flow cell along at least part of the second helical thread.

25. The flow cell assembly of claim 21, wherein the flow cell laterally encloses the connector along at least part of the first helical thread.

26. The flow cell assembly of claim 21, wherein the connector comprises a connector body, and a distinct tubular extension part secured to the connector body.

27. The flow cell assembly of claim 26, wherein the tubular extension part has a tapered outer surface at a distal end of the tubular extension part.

28. The flow cell assembly of claim 21, wherein the connector comprises a plurality of longitudinal channels defined along an outer surface of the connector, for allowing a passage of a temperature-control gas along the connector.

29. A nuclear magnetic resonance probe comprising:
a nuclear magnetic resonance flow cell assembly for holding a nuclear magnetic resonance sample, comprising:
a flow cell for holding the nuclear magnetic resonance sample, the flow cell having a first helical thread along a lateral surface of the flow cell;
sample flow tubing for providing fluidic access to the flow cell;
a connector for fluidically connecting the sample flow tubing to the flow cell, the connector including a flow cell connector bore sized to accommodate an end region of the flow cell, the connector having a second helical thread matching the first helical thread, for screwing the connector to the flow cell; and
a sealing barrier positioned between a transverse end surface of the flow cell and a transverse surface of the connector, the sealing barrier being pressed between the flow cell and the connector when the flow cell and the connector are screwed together, for sealing an interface between the flow cell and the connector; and

a set of nuclear magnetic resonance coils coupled to the flow cell assembly, for performing a nuclear magnetic resonance measurement on the sample.

30. A nuclear magnetic resonance method comprising:

5 inserting a nuclear magnetic resonance sample into a nuclear magnetic resonance flow cell assembly comprising

a flow cell for holding the nuclear magnetic resonance sample, the flow cell having a first helical thread along a lateral surface of the flow cell;

sample flow tubing for providing fluidic access to the flow cell;

10 a connector for fluidically connecting the sample flow tubing to the flow cell, the connector including a flow cell connector bore sized to accommodate an end region of the flow cell, the connector having a second helical thread matching the first helical thread, for securing the connector to the flow cell; and

15 a sealing barrier positioned between a transverse end surface of the flow cell and a transverse surface of the connector, the sealing barrier being pressed between the flow cell and the connector when the flow cell and the connector are secured together, for sealing an interface between the flow cell and the connector; and

20 performing a nuclear magnetic resonance measurement on the sample while the sample is situated in the flow cell.

31. The method of claim 30, further comprising inserting the flow cell assembly into a nuclear magnetic resonance probe through a central bore of the nuclear magnetic

25 resonance probe while the nuclear magnetic resonance probe is positioned in a nuclear magnetic resonance magnet.

32. The method of claim 31, further comprising removing the flow cell assembly from the nuclear magnetic resonance probe through the central bore while the nuclear magnetic
30 resonance probe is positioned in the nuclear magnetic resonance magnet.